SLIDE HINGE FOR SMALL-SIZED INFORMATION TERMINAL

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a slide hinge for a small-sized information terminal such as a cellular phone, PHS, PDA and so on.

2. Description of the Related Art

Recently, remarkable progress has been made in techniques for small-sized information terminals such as a cellular phone, PHS, and PDA, in which one becoming a mainstream is configured such that it is further reduced in size and improved in portability, and in addition, to achieve a larger display portion, a keyboard portion and a display portion are provided in separate casings, and a first casing provided with the keyboard portion and a second casing provided with the display portion are made foldable to each other using hinges. These hinges have a function of automatically opening/closing the first casing and the second casing from a predetermined open/closed angle.

However, there are strong demands for a reduced size and improved portability of such a small-sized information terminal. For this reason, a slide hinge has been proposed which slidably links the first casing and the second casing which are overlapped each other.

Well-known one having the above-type configuration is disclosed in Japanese Patent Application Laid-open No. 2002-300243.

The slide hinge disclosed in Patent Document 1 is for a cellular phone, in which the first casing provided with the keyboard portion and the second casing provided with the display portion are configured to be able to relatively and linearly slide through a pair of slide means. Each slide means is composed of a slide member, an accommodating plate secured to the second casing for accommodating the slide member, and a guide plate supporting the slide member in cooperation with the accommodating plate and formed with a guide hole for guiding a slide of the slide member.

In the above-described configuration, it is not necessary to protrudingly provide on the upper portion of each casing the hinge foldably linking the first casing and the second casing, so that a cellular phone can be shortened in length into a small size. However, a problem of poor operability arises because there is no function of automatically sliding the second casing immediately before the second casing covers the top surface of the first casing or immediately before the second casing exposes the top surface of the first casing at a maximum.

SUMMARY OF THE INVENTION

Hence, it is an object of the present invention to provide a slide hinge for a small-sized information terminal composed of a first casing and a second casing, the slide hinge having a function of relatively and automatically sliding the first casing and the second casing from predetermined slide positions.

To achieve the above object, the present invention is a slide hinge in which a first casing provided with a keyboard portion and a second casing provided with a display portion are relatively slid, wherein the slide hinge is characterized by including a linear slide means provided between the first casing and the second casing and a turning means for performing a turning operation accompanying linear slide operations of the first casing and the second casing by the slide means. The slide means is composed of guide grooves provided on both side portions of the second casing, while fixing members are attached to substantially central parts on both sides of said first casing in such a manner as to protrude upward. First guide pins are engaged with the guide grooves and attached to free end portions of the fixing member. The turning means is composed of rotary hinges provided at the end of both side portions so as to generate a rotational torque from predetermined turning angle. Turning members are attached to the rotary hinges in one end portion thereof, and second guide pins are attached to both free end potions of the turning members and engaged with each one of the guide grooves.

In this event, in the present invention, it is possible that the rotary hinged is configured so as to generate rotational torque from a predetermined turning angle, while the second casing is slid with respect to the first casing, and then a tip side of the second casing is raised, and automatically opened from the first casing up to a predetermined angle.

Further, in the present invention, it is possible that a first casing provided with a keyboard portion and a second casing provided with a display portion are relativley slid, and the slide hinge is characterized by a linear slide means provided between the first casing and the second casing and a turning means for performing a turning operation accompanying linear slide operations of said first casing and the second casing by said slide means. The slide means is composed of a first quide groove provided on an undersurface of the second casing, a first guide pin engaged with the first groove and attached to an upper surface of said first casing. The turning means is composed of a rotary hinge provided on an upper surface of one side portion of said first casing, a turning member rotatably attached to said rotary hinge by one end portion thereof in a horizontal direction, a second pin attached to a free end portion of said turning member and engaged with a second groove provided on said undersurface of said second casing in cross direction of said first guide groove.

Further, in the present invention, it is possible that the rotary hinges is provided so as to generate rotational torque from a predetermined rotation angle. Thus, said second casing is automatically slid in a longitudinal direction with respect to said first casing from a predetermined sliding position.

Furthermore, in the present invention, it is possible that the rotary hinges are composed of a case body having a rotation arresting means provided on its outer periphery, a shaft provided through the central part of said case body in an axial direction, a cam attached to said shaft, a cam follower fo which rotations are arrested by said case body and which is attached to be slidable in an axial direction while allowing the shaft to be rotatably inserted through the central part thereof in an axial direction on one hand, and on the other hand, an elastic means composed of a compression spring elastically provided between said cam and follower and a side wall of said case body.

Moreover, in the present invention, it is possible that the guide groove has a c-channel form of a cross-section.

Since the present invention is configured as described above, the first casing and the second casing are configured to be relatively slidable by the slide means, whereby they can operate accompanying the operation of the slide means and the first casing can automatically slide with respect to the second casing in the opening direction and/or the closing direction from predetermined a slide position by the turning means generating rotation torque from a predetermined turning angle, so that the present invention can provide an